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Some Notes on the Flora of Ontonagon County, Michigan

By L. H. Pammel and Vernon Fisk.

It has been the custom for some years with the forestry students of Iowa State College to spend one summer in camp to get practical field work. These camps have been in various places—Colorado, Minnesota, Michigan and the Appalachian Mountains. Along with the practical forestry work these students also do field work in botany along taxonomic and ecological lines. It has been possible therefore to make an intensive ecologic and floristic study of the region. This is one of a series of papers in which the flora has been discussed¹.

The Ames foresters' camp was located on the shores of Lake Superior just west of the mouth of Big Iron River. This point was formerly a trading post for the Hudson Bay Trading Company and later a mining camp known as Silver City. After the war of 1812 the territory was ceded to the United States government. The Chippewa Indians, however, occupied the territory and in 1842 these Indians made a treaty with the United States ceding this territory. It is in the county of Ontonagon and near the Porcupine Mountains, located between the Iron and Presque Isle rivers. The latter is said to be the highest point between Lake Superior and the Black Hills. Keweenaw Peninsula, an active mining region, is further east. Ontonagon lies between the peninsula and Big Iron river. Gogebic Lake is to the south and lies in a district with numerous lakes and peat bogs. The forest vegetation is quite different. The chief industry in the vicinity of the camp was logging. The timber of much of the country to the east and some to the west has been cut.

No doubt game was abundant in this region—deer, beaver, buffalo, mink, etc. The buffalo must have disappeared in the early thirties because historians record that the last buffalo seen on the east bank of the St. Croix river in Wisconsin was in the thirties. The senior author

¹L. H. Pammel. The Beginning of Forestry Instruction at Ames and the Iowa State College Forestry Summer Camps. The Ames Forester 1927:39-47.

found a fine buffalo skull in the sandy bank on the shores of the lake (Lake Superior) some 6 miles east of the camp. We record this because there are those who claim the buffalo did not occur here.

The region became known as a possibility for mining at an early day; as long ago as 1636 LaGarde published a book in Paris in which he reported the finding of copper, as did other missionaries between 1632 and 1672. The region was visited by Claude Allouez in 1666. Captain Johnathan Carver gave an account of the region and later, 1819, H. R. Schoolcraft² visited the region. Major Long visited the region in 1823. A. G. Ruthven³ states that nearly all of the mining prospects were abandoned by 1848. Dr. Douglas Houghton⁴ made a report on the region in 1831. Dr. Houghton was also interested in plants. The geology of the Porcupine region has been treated by several geologists chiefly with reference to the economic mineral phases. Roland D. Irving⁵ on the copper bearing rocks, mentions the occurrence of slate to the east of the Porcupine Mountains, and gives in a general way something about the ridge, which rises some 1,000 to 1,200 feet above the shore of Lake Superior. C. R. Van Hise and C. K. Leith⁶ call attention to the geology of Keweenaw peninsula, the narrow plateau with its monadnocks which rise above the general level, the rounded ridges of the Porcupine Mountains, with cliffs facing indifferently in all directions. A. G. Ruthven cited above states that the rock belongs to the Keweenawan series consisting of trap rocks which are basic, the acid rocks known as porphyries and the detrital. The basic rocks are eruptive. The detrital consist of shales, sandstones and conglomerate. The topography of a country is dependent in part on the amount of erosion of the rocks, and this as well as the character of the soil is intimately connected with the distribution of plant life. It is therefore important to consider this.

Since plant life is dependent on the character of the topography and soil it is important to consider these points. The area is rough with three parallel ridges. The highest point is 2022 feet above sea level. The first ridge, according to Ruthven, is 1450 to 1500 feet above sea level, then drops

²Narrative Journal Travels 1820. 1821.

³Rep. Michigan State Board of Geol. Survey 1905:19.

⁴See Upper Peninsula of Michigan, Report Mich. Geol. Survey 1869-1973; 1:1.

⁵U. S. Geological Survey 1883:206.

⁶The Geology of the Lake Superior Region. U. S. Geol. Survey 1911: 97, 380, 385, 421, 579.

to 1000 feet in Carp Valley, with its Carp Lake. The road follows the north slope of the first ridge. This was at one time a heavily timbered section and there are still many pine trees, mixed with hemlock, balsam firs, birch, basswood, and ash. A good treatise on the geology of the region will be found, by Frank Leverett⁷, "Surface Geology and Agricultural Conditions of Michigan."

Rocks in the Porcupine district protrude above the drift in the Huron Mountains, Copper Range, Keweenaw Peninsula, and the Porcupine Mountains on the border of Lake Superior near the western end of the Peninsula. Dr. Leverett gives an interesting account of the movement of the glaciers across this region. The Porcupine Mountains, which are near the northwest end of the peninsula, rise rather abruptly from the shores of Lake Superior.

One of the interesting geological features to be mentioned in this connection is ancient Lake Ontonagon which is discussed by Leverett in the above citation. This is the oldest and highest of the large glacial lakes in the northern peninsula. It was in the basin of the Ontonagon river. This lake was 700 feet above Lake Superior, or 1320 feet above sea level. The streams coming from the Porcupine Mountains are all short with a rapid current.

The camp was located near the base, but a mile and a half eastward. It was easy, therefore, to reach the mountains and explore the region beyond the range. We therefore had a chance to make a study of the plant life on the shores of Lake Gogebic near Bergland. There are no tamarack and spruce swamps, only small arbor vitae swamps on the north side of the Porcupine Mountains. Spruce and tamarack swamps are common in the Gogebic area. Much has been published on the plant life of Michigan. W. J. Beal⁸ has numerous references to the flora of northern Michigan. O. A. Farwell⁹ has given localities for some plants in the northern peninsula. An excellent ecological study has been made of Isle Royale, Lake Superior, under the direction of Charles C. Adams¹⁰. Dr. H. A. Gleason, O. H. McCrary, W. P. Holt, Max Miner Peet, were associated with Dr. Ad-

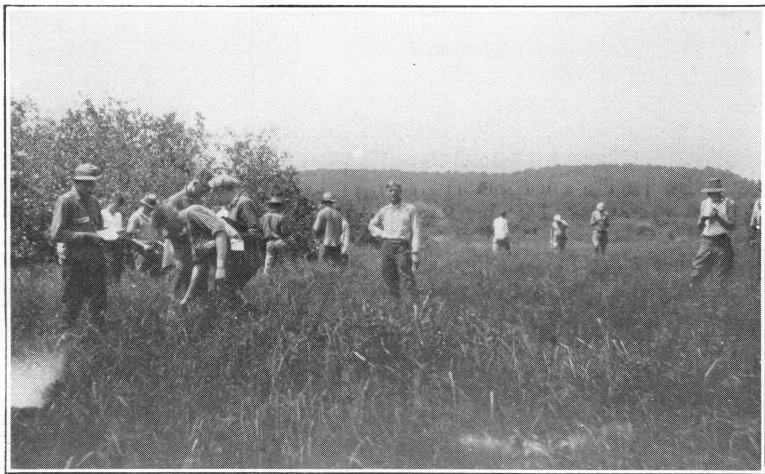
⁷Michigan Geological and Biological Survey. 25. Geological Series 21.

⁸Michigan Flora. A list of the General Seed Plants Growing without Cultivation. Mich. St. Board of Agr. Mich. Acad. Sci. 1904, separate.

⁹Notes on Michigan Flora. Mich. Acad. Sci. 20:161; 21:345; 22:177; Papers 1:85; 2:11.

¹⁰An Ecological Survey of the Isle Royale Lake Superior. Rep. Mich. Geol. Survey 1908:1-468, f 1-63. There are also five bibliographies and a discussion of previous work done in the region.

ams in this work. The treatise takes up the biotic environment of plants, geological succession, the ecological relations of invertebrate fauna, birds, the vegetation of Isle Royale, insects and mammals. A. G. Ruthven¹¹ has made a thorough ecological study of the Porcupine Mountains and Isle Royale in which he discusses the geology and the plant life. C. K. Dodge¹² published an account of the flora of



Border of tamarack and spruce bog with willows, pitcher plant, *Habneria* and cranberry near Bergland, south of the Porcupines.

Chippewa and Schoolcraft counties in the northern peninsula. He gave detailed notes on the abundance of species. There are excellent works on the plants of the lakes, beaches, ponds, and bogs in the Lake Superior region.

The senior author¹³ spent a few weeks with the Ames foresters at their camp near Stambaugh, Michigan, in 1924, and published a paper partly taxonomic and partly ecological. This area in some respects is quite different than the Ontonagon area. Prof. A. G. Ruthven¹⁴ who made a study of the plants of the region under the direction of Dr. Charles G. Adams, published a list of the plants arranged by families, also an account of habitats and associates. A

¹¹Rep. Mich. Geol. Survey 1905:17-55.

¹²Michigan, Miscellaneous Papers of the Botany of Michigan. Michigan Geological and Biological Survey. Biological Series 6.

¹³Some Notes on the Flora of Forest and Florence Counties, Wisconsin, and Iron County, Michigan. Proc. Ia. Acad. Sci. 32:99-114. 7f.

¹⁴Rep. Mich. Geol. Survey 1905:75.

¹⁵1st session 31st Congress 3.

much earlier list was published by W. A. Burt in 1848¹⁵. He made the collection under the auspices of one of the early exploring expeditions.

In this brief paper we shall only take up a few of the plant ecological aspects of the region.

INTRODUCED PLANTS

Silver City was settled many years ago by the Hudson Bay Company. There are many introduced plants; no doubt some were brought in by the Hudson Bay Company and others by the miners who early occupied this territory, as early as the beginning of the last century, to the forties. The traders of the Hudson Bay Company must have accidentally planted the seed of some exotic plants here. The most striking thing is that such plants as the ox-eye daisy are perfectly at home. The little clearings are white. Then, too, red and white clover, timothy, red top, of the herbaceous plants have adapted themselves to this environment. One is also interested to find that the fragrant cinnamon rose, too, is perfectly at home. There are also numerous seedling apple trees. Also the lilac (*Syringa vulgaris*). A short list of the introduced plants in meadows around buildings, yards, etc., follows:

Achillea lanulosa (Nutt), abundant; *Agrostis alba* L., abundant; *Agropyrum repens* (L) Koch., common; *Anthemis cotula* L., common; *Avena fatua* L., abundant; *Brassica nigra* (L) Koch, common; *Capsella bursa pastoris* L. Medic., common; *Chenopodium album* L., infrequent; *Chrysanthemum leucanthemum* L., abundant; *Cirsium arvense* (L) Scop, common; *Dactylis glomerata* L., common; *Dianthus barbatus* L., common; *Digitaria sanguinalis* (L) Scop., common; *Erigeron canadensis* L., common; *Juncus tenuis* Willd., common; *Leonurus cardiaca* L., common; *Nepeta cataria* L.; *Oenothera biennis* L., infrequent; *Oxalis corniculata* L., infrequent; *Pastinaca sativa* L., common; *Phleum pratense* L., abundant; *Plantago lanceolata* L., abundant; *Plantago major* L., abundant; *Polygonum aviculare* L., common; *Polygonum convolvulus* L., common; *Polygonum persicaria* L., common; *Poa pratensis* L., infrequent; *Poa annua* L., abundant; *Prunella vulgaris* L., common; *Radicula armoracia* (L) Robinson; *Ranunculus acris* L., abundant; *Rosa rubiginosa* L., common; *Rumex acetosella* L., abundant; *Rumex crispus* L., common; *Rumex obtusifolius* L., common; *Taraxacum officinale*, Weber, common; *Trifolium agrarium* L., common; *Trifolium repens* L., abundant; *Trifolium hybridum* L., common; *Trifolium*

pratense L., abundant; *Setaria glauca* (L) Beauv., common; *Setaria viridis* (L) Beauv., common; *Silene noctiflora* L., common; *Verbascum Thapsus* L., common; *Vicia sativa* L., common.

BEACH AND SHORE VEGETATION

The beach vegetation along the shore of the lake is not a large one because it is subject to wave action. On the sand dunes one may see an abundance of *Lathyrus maritimum* (L) Bigel; *Potentilla anserina* L.; *Calamagrostis canadensis* (Michx.) Beauv. On the higher old beaches now largely sand dunes the following plants, *Solidago graminifolia* (L)



Cinnamon rose (*Rosa cinnamonia*) abundantly naturalized.

Salisb.; *Campanula rotundifolia* L.; *Ribes floridum* L'Her.; *Fraxinus lanceolata* (Borkh) Sarg.; *Pyrus americana* (Marsh) D. C.; *Betula papyrifera* (Marsh) Spach; *Picea canadensis* (Mill) BSP.; *Lobelia spicata* Lam.; *Viburnum opulus* L.; *Ulmus incana* (L) Moench.; *Heracleum lanatum* Michx.

Beach plants* are as follows: *Alnus incana* (L) Moench; *Anemone virginiana* L.; *Agrcpyron caninum* (L) Beauv.; *Betula papyrifera* (Marsh) Spach; *Calamagrostis canadensis* (Michx.) Beauv.; *Campanula rotundifolia* L.; *Cornus stolonifera* Michx.; *Cornus canadensis* L.; *Eugisetum sylvaticum* L.; *Elymus canadensis* L.; *Fraxinus nigra* Marsh; *Fraxinus lanceolata* (Borkh) Sarg.; *Fraxinus pennsylvan-*

ica Marsh; *Nemopanthus mucronata* (L) Trel; *Lobelia spicata* Lam.; *Heracleum lanatum*, Michx.; *Lathyrus maritimus* (L) Bigel; *Potentilla Anserina* L.; *Prunus pennsylvanica*; *Picea canadensis* (Mill) BSP; *Pyrus americana* (Marsh) DC; *Rubus idaeus* L. var *aculeatissimus* (C. A. Mey) Regel & Tiling.; *Rubus triflorus* Richards; *Ribes floridum* L'Her; *Solidago graminifolia* (L) Salisb.; *Thuya occidentalis* L.; *Viburnum opulus* L.

Back of the sand dunes are little shallow depressions or small ponds; the water is largely seepage water from the lake. Here there is an abundance of *Fraxinus nigra* Marsh; *Thuya occidentalis* L.; *Cornus stolonifera* Michx.; *Salix lucida* Muhl; *Spirea salicifolia* L.; *Alnus incana* (L) Moench; *Calamagrostis canadensis* (Michx.) Beauv.; *Campanula aparinoides* Pursh; *Eupatorium purpureum* L.; *Impatiens fulva* Nutt. The higher land back of the marsh, an old lake bed, is more or less rocky and supports a typical mesophytic forest with such plants as *Abies balsamea* (L) Mill.; *Picea canadensis*; *Betula lutea*, Michx.; *Betula papyrifera*; *Tsuga canadensis* (L) Carr.; *Acer saccharum* Marsh. The ground cover contains *Lycopodium clavatum* L.; *Lycopodium lucidulum* Michx.; *Aster macrophyllus* L.; *Mitchella repens* L.; *Smilacina bifolia* (L); *Streptopus amplexifolius* (L) D. C.; *Linnaea borealis* L. var *americana* (Forbes) Rehder.

On the upper slopes higher up on the mountains, the following trees occur: *Quercus rubra* L.; *Tilia americana* L.; *Tsuga canadensis*, *Pinus strobus* L.; *Abies balsamea*. A ground cover consisting of *Ostrya virginiana* (Mill.) K. Koch.; *Solidago bicolor* L.; *Linnaea borealis* L., var *americana*; *Gaultheria procumbens* L.; *Arctostaphylos uva-ursi* (L) Spreng; *Scorylus restrata* Ait.; *Diervilla lonicera* Mill.; and *Rubus idaeus* var *aculeatissimus*.

PLANTS OF SWAMP

Alnus incana (L) Moench; *Alopecurus geniculatus* L. (low ground and lake shores); *Bromus Kalmii*; *Calamagrostis canadensis* (Michx.) Beauv.; *Caltha palustris* L.; *Campanula aparinoides* Pursh.; *Cicuta maculata* L.; *Cornus stolonifera* Michx.; *Eupatorium purpureum* L.; *Fraxinus nigra* Marsh; *Glyceria canadensis* (Michx.) Trin.; *Glyceria nervata* (Willd.) Trin.; *Impatiens fulva* Nutt.; *Iris versicolor* L.; *Linnaea borealis*; *Mentha arvensis* L.; *Muhlenbergia capillaris* (Lam.) Trin.; *Panicum*, sp.; *Rumex altissimus*, Wood.; *Salix lucida* Muhl.; *Smilacina trifolia* (L) Desf.; *Spiraea salicifolia* L.; *Thuya occidentalis* L.

LIST OF PLANTS IN MESOPHYTIC FOREST

Abies balsamea; *Acer rubrum* L.; *Acer saccharum*; *Acer spicatum*; *Alnus incana* (L) Moench; *Amelanchier canadensis* (L) Medic; *Antennaria plantaginifolia* (L) Richards; *Apocynum androsaemifolium* L.; *Aralia hispida* Vent.; *Aralia nudicaulis* L.; *Artostaphylos uva-ursi*; *Aspidium marginale* (L) Sw.; *Aster macrophyllus*; *Betula lutea*; *Betula papyrifera*; *Calamagrostis canadensis*; *Cicuta maculata* L.; *Clintonia borealis* (Ait.) Raf.; *Cornus canadensis* L.; *Corralorhiza trifida*, Chatelain; *Cypripedium acaule*, Ait.; *Corylus rostrata*; *Diervilla lonicerica*; *Gaultheria procumbens*; *Fragaria vesca* L.; *Linnaea borealis*; *Lycopodium clavatum*; *Lycopodium lucidulum*; *Mitchella repens*; *Populus balsamifera* L.; *Onoclea struthiopteris* (L) Hoffm.; *Ostrya virginiana*; *Osmunda claytoniana* L.; *Oxalis acetosella* L.; *Picea canadensis*; *Pinus strobus* L.; *Populus grandidentata* Michx.; *Populus tremuloides*, Michx.; *Pyrus americana* (Marsh) D. C.; *Prunus pennsylvanica* L.; *Pteris aquilina* L.; *Quercus rubra*; *Rubus Idaeus* var *aculeatissimus*; *Rubus parviflorus* Nutt.; *Rosa Woodsii* Lindl.; *Solidago bicolor*; *Tilia americana*; *Tsuga canadensis*.

ROCKY BANK TO RIVER'S EDGE

Anemone canadensis L.; *Anemone quinquefolia* L.; *Aquilegia canadensis* L.; *Aralia nudicaulis* L.; *Asplenium filix-femina* (L) Bernh.; *Danthonia spicata* (L) Beauv.; *Epigaea repens* L.; *Epilobium angustifolium* L.; *Erigeron glabellus* Nutt.; *Erigeron philadelphicus* L.; *Fraxinus lanceolata*; *Galium aparine* L.; *Glyceria canadensis* (Michx.) Trin.; *Hieracium scabra* L.; *Lathyrus ochroleucus* Hook.; *Lycopodium dendroideum* Michx.; *Mimulus ringens* L.; *Pinus resinosa* Ait.; *Polypodium vulgare* L.; *Prenanthes alba*; *Pyrola secunda* L.; *Ribes cynosbati* L.; *Ribes floridum* L'Her.; *Salix rostrata* Richards; *Senecio aureus* L.; *Trillium erectum* L.; *Verbena hastata* L.; *Vicia americana* Muhl.

BURNED OVER AREA

In order to find out the type of plant life that was coming in on burned over land, a plant census was taken on an area that had been burned over in 1923. This area lies between Lake Superior and the road to Ontonagon, at a point west of the Little Iron river. The land is sandy and has been made by the Lake Superior sands. A number of 4x4 plots were taken on this burn and the percentages of occurrence were computed.

Percentages of Plants on Burns

<i>Acer spicatum</i>	1.48
<i>Agropyrum repens</i>47
<i>Amelanchier spicata</i>28
<i>Aralia hispida</i>09
<i>Betula lutea</i>65
<i>Clintonia borealis</i>	1.2
<i>Chrysanthemum leucanthemum</i>	
<i>Cornus canadensis</i>	10.1
<i>Epilobium angustifolium</i>	3.6
<i>Erigeron canadensis</i>	25.0
<i>Gnaphalium uliginosum</i> L.	9.3
<i>Polygonum scandens</i> L.	1.48
<i>Populus tremuloides</i> , Mich.28
<i>Prunus pennsylvanica</i>	5.2
<i>Pteris aquilina</i>85
<i>Rubus ideaus</i> var. <i>aculeatissimus</i>	10.8
<i>Rubus parviflorus</i>	1.9
<i>Rumex acetosella</i>	21.3
<i>Smiliacina trifolia</i> (L) Desf.	1.7
<i>Taraxacum officinale</i>18
<i>Verbascum Thapsus</i>38

GOGEBIC LAKE

The bogs are of two types. The senior author* has called attention to two characteristic bog types. One where the *Sarracenia purpurea* L., *Drosera rotundifolia* L., and *Spagnum* are abundant. This bog having such characteristic plants as *Cirsium muticum* Michx., *Carex filiformis* L., *Pedicularis lanceolata* Michx., *Salix rostrata*. This is the type of bog found in northern Iowa. The bogs on the north side of the mountain range belong to this general class excepting the *Thuja occidentalis* and *Abies balsamea* and *Larix americana* Michx., do not occur in Iowa. This is the type we found at numerous places near Gogebic Lake, however, there are numerous bogs of the spagnum type in the Gogebic Lake region.

The older type of bog had an abundance of *Betula glandulosa* Michx.; *Alnus incana*; *Eupatorium purpurea* L.; *Campanula aparinoides* Pursh.; *Lobelia Kalmii* L.; *Carex filiformis*; *Menyanthes trifoliata* L.; *Viburnum Opulus* L.; var. *americanum* (Mill.) Ait. The *Spagnum* type of bog contains the above plants, and *Sarracenia purpurea*, *Larix americana*, *Picea mariana*, *Thuja occidentalis*, cranberry, *Vaccinium macrocarpon* Ait.; *Drosera rotundifolia*, *Ledum Groelandicum*, *Chamaedophne calyculata* (L), *Kalmia polifolia* Wang.; and *Pogonia ophioglossoides* (L) Ker.

*L. H. Pammel, Flora of Iowa, Peat Bogs, Rep. Soc. Geol. Survey 19:735.